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Indus Delta Country. A Memoir Chiefly  
on its Ancient Geography, History and  
Topography.

Malcolm Robert Asie



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THE  
INDUS DELTA COUNTRY

A MEMOIR

*CHIEFLY ON ITS ANCIENT GEOGRAPHY, HISTORY  
AND TOPOGRAPHY*

BY

MAJOR-GENERAL M. R. HAIG, M.R.A.S.

*With Three Maps.*

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# THE INDUS DELTA COUNTRY.

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## I.

### SKETCH OF THE GEOGRAPHY AND HYDROGRAPHY OF THE DELTA COUNTRY.

A POPULAR geographical notion of its inhabitants distinguishes three main divisions of the Lower Indus Valley. These are named *Siro*, or "Upper Country;" *Vicholo*, or Middle Country; and *Lāru*, or "Sloping, descending (to the sea) Country," and correspond respectively to Upper Sindh, or the country north of about  $27^{\circ}$  N. lat., 40 miles above Sēwan; Central Sindh, or the tract between that limit and Haydarābād; and Lower Sindh, extending from Haydarābād to the sea. This last division may be treated as the historical Delta country of the Indus, that is, the Delta country as seen when the light of history first falls upon it in the descriptions of the writers on Alexander's expedition. At that period the head of the Delta was at Patala, where the river divided into two large branches, running, one south-east, the other south-west, to the sea, and each retaining the name Indus. Any precise identification of the site of Patala is hardly within the limits of possibility. I am unable to agree with the authorities who would place it at Haydarābād, or with others who think Thaṭa a more likely situation; but there are grounds, as we shall see, for the conjecture that it lay not very far below the latitude of the former town, though considerably to the east of its longitude. It seems, therefore, legitimate to assume that the Sindhī geographical division of "*Lāru*" is nearly identical with Patalene, or the Delta country of the Indus as known to the Greeks.

The Delta tract of this memoir, then, extends from the sea northward to the latitude of Haydarābād, or  $25^{\circ} 23' N.$ , and is bounded on

the east by the sandhills of the desert, by the farthest eastern channel of the Indus, known as the *Purān*, which has long ceased to carry water except in times of unusually high floods, and by the *Korī* Mouth or Creek, which separates the Delta from *Kachchha*; on the west by the outer border of the plains, formed of hill débris, sloping eastward and southward from the *Kohistān* or mountainous region of *Sindh*. Here the boundary runs south by west for 50 miles to within a short distance from *Thaṭa*, where it turns almost due west, and continues for 60 miles more to the sea near *Karāchī*. The Delta region thus defined contains an area of nearly 10,000 square miles, the length of its different sides being—on the north, from the Indus west of *Haydarābād* to *Umarkot*, 90 miles; on the east, from *Umarkot* to the mouth of the *Khorī* Creek, 150 miles; on the west, from *Haydarābād* to near *Thaṭa*, and thence to the south-eastern point of *Clifton* sands near *Karāchī*, 110 miles; and the coast-line, 125 miles.

This alluvial tract is everywhere furrowed by ancient river channels, some continuous throughout the Delta region, and for many miles above it, but very many others in a more or less obliterated condition, and traceable but for short distances. Among the former we find on the extreme eastern border a channel with a very old and interesting history. This is the *Hākro*, which skirts the sandhills and runs into the *Purān* about 20 miles north of the *Ran* of *Kachchha*. *Hākro* is a name in modern times restricted to the lower part of what has become a flood-channel of the Indus, and is now known as the *Nārā* (officially, Eastern *Nārā*), but it once belonged to an entirely independent river, of which the *Nārā* channel formed a part.<sup>1</sup> The course of this river, may be traced throughout *Sindh*, in the far north of which it bears the name of *Wāndan*; through *Bahāwalpūr* where the name *Hākra* or *Hakra* reappears, but is eventually replaced by that of *Sūḍharah* and others; thence through the north of *Bīkānūr*, and onward beyond *Rājputāna* to the foot of the *Himālaya*. The opinion that this "lost river," as it has been called, was no other than the *Satlaj*, which some centuries ago forsook its original bed not far from the point where it leaves the mountains, and turning north-westward into the valley of the *Biyāh*, eventually mingled its waters with those of the latter river, has been ably maintained by a writer in the *Calcutta Review*.<sup>2</sup> Whether this has

<sup>1</sup> *Nārā* is merely a *Sindhī* modification, by the common process of substituting *r* for *l*, of *Nālā* (vulg. *Nullah*), a "torrent-bed," "flood-channel," &c.

<sup>2</sup> No. cxvii., vol. lix., 1874, "The Lost River of the Indian Desert."

been proved or not, it is certain that the Hākro of Lower Sindh was formerly a part of the course of an independent stream, the drying up of which has been calamitous, not only in reducing thousands of square miles of once fertile land and inhabited country to waste and solitude, but also in forcing a vast additional body of water into the already overcharged channel of the Indus, thus enormously increasing the risk of desolating floods along the lower course of that river.

Four or five miles west of the Hākro, and for a long distance parallel with it, lies an old channel of the Indus called the Badahrī, which enters the Purāṇ about 18 miles north of the confluence of the Hākro with the latter. This also is now a mere flood-channel, and is connected with the Hākro; but the upper portion of its course, much silted up, and after some miles disappearing altogether, comes from the north-west in such a direction as to indicate that, when flowing, it must have left the main river at some bifurcation in Central Sindh. As other portions of old channels trending in the same direction, and probably remnants of the branch to which the Badahrī belonged, are found not far south-east of the conjectured site of the Arab capital Maṇṣūra, it is not unlikely that this channel is the one described by El-Birūnī as leaving the Indus at Maṇṣūra and running east (south-east) to the border of Kaḥchha. Its name, he says, was *Sind Sāgar*.<sup>3</sup>

But the most important of all the forsaken channels of the Indus is the *Purāṇ*. This can still be clearly traced from two different starting-points in Central Sindh, one 24, the other 36 miles north-east of Haydarābād. The two head-channels run south-east for about 50 miles, and unite at a spot 45 miles east by south from Haydarābād, whence the single channel has a course first south and then south-west of over 140 miles to the head of the Korī Creek, the last 50 miles being through the Ran of Kaḥchha. The lower part of the channel in Sindh is still half a mile broad in some places, and for a long distance the average breadth is perhaps a quarter of a mile. West of the Purāṇ we find many ancient channels, some of which are of considerable length, while many are mere fragments of former courses of the river. Among the former is one which has now no general name, various portions of it being distinguished by appellations evidently of modern date, and known only within a limited area. Its head-waters, like those of the Purāṇ,

<sup>3</sup> Sir H. Elliot's "History of India," i. 49. The question of the site of Maṇṣūra has been discussed by the author in the *Journal of the Royal Asiatic Society*, vol. xvi., part 2.

seem to have run in two streams, the more northern of which left the Indus in the lower part of Central Sindh. This channel joins the Purāṇ about 10 miles north of the Ran of Kachchha. For convenience-sake it will be called in this memoir the "Western Purāṇ." Still farther west, at an average distance of about 12 miles, we come upon the Rēn, a branch which left the Indus at a point 25 miles south east of Haydarābād, and had a course generally south of over 80 miles into the Ran, a little within the Sindh border. Whether its waters here spread over the Ran, or eventually made a channel for themselves into the sea, I am not aware, but the surveyors have not traced the channel beyond a depression in the Sindh Ran. The Rēn may be called modern, as it dried up so late as the middle of last century, when the Indus suddenly abandoned its course some miles above Naṣrpur, and struck into its present line west of Haydarābād. It seems not to have been a very large branch; the local historians, indeed, apply the Persian term *Jū'ibār* to it, indicating a small stream. Parts of its channel are now occupied by the *Gūnī*, a continuation of the *Phulēlī*, which leaves the Indus 10 miles north of Haydarābād: other parts have been utilised as irrigational canals. The Rēn, as we shall see, is of some historical interest in connection with the wanderings of the Emperor Humāyūn in Sindh during the darkest period of his fortunes. Farther west again, at a distance varying from 15 to 35 miles, is the *Gūngro*. The upper portion of this channel is not now distinctly traceable; I mean, its original head-channel, for the *Gūngro* is now an irrigational canal, and derives its supply from courses opened in comparatively recent times. It probably issued from the Indus some miles below the head of the Rēn branch. Its course is generally south, and it reaches the sea by the long tidal channel known as the *Sir Mouth*; the total length of *Gūngro* and *Sir* being about 120 miles. On its right bank the *Gūngro* is joined by the *Pīnyārī*, which leaves the Indus some miles south of the town of Jhirk (better known to Europeans under the corrupted name *Jerruck*); but this portion of the course of the Indus is, as will presently be explained, of modern date, and the *Pīnyārī*, as a branch of it, calls for no further notice. Near the latitude of Thāṭa the *Gūngro* runs for some miles through the bed of what must have been a far older branch, the course of which is here nearly due east and west, but is not traceable for more than 8 or 10 miles. This small remnant of what, judging from its size, must once



have been the main bed of the Indus, possesses some interest from the fact that the city of *Tūr*, the capital of the Sūmra chiefs when they held sway in Lower Sindh, was situated on its southern bank. There is reason to suppose, as will be seen hereafter, that this channel dried up in the early part of the fourteenth century.

West of the Gūngro, lying between it and the present course of the Indus, is the lower portion of that channel, which has been mentioned as having dried up on a sudden shifting of the Indus westward about the middle of last century. If a map of Sindh be examined, it will be noticed that at about 25 miles north by east of Haydarābād the river, which has hitherto been flowing in a south-easterly direction, curves sharply to the west towards the village of Unarpūr, and then runs south and south-west. It was at this point that the change of course took place. For many years previously the river, continuing its south-easterly direction, had run by Naṣrpūr, which was on the left bank, and then south to the point where the Rēn left it, whence it turned south-west towards Thaṭa. It is known that this channel finally dried up in 1758, but it is said that it began to fail a few years earlier, the river apparently taking a little time to force its whole volume into the new course. The entire length of the abandoned channel, now known as the *Phīṭo*,<sup>4</sup> is considerably over 100 miles, its greatest distance from the present course of the river being about 20 miles. For the last 60 miles its course is no longer continuous, but may be traced by its numerous remnants, while the northern half is clearly defined throughout nearly its entire extent.<sup>5</sup> Twelve miles north of the head of the Rēn another channel, called the *Mābān*, leaves the *Phīṭo*, and runs south-east. Its course has not been traced by the surveyors for more than about 25 miles, but it probably joined the Western *Purāṇ*. The head of the *Mābān* is situated in the midst

<sup>4</sup> The word means "abandoned," and is frequently applied to dried-up channels.

<sup>5</sup> It was on this channel, about 10 miles above Naṣrpūr, and near the village of *Bohīrī* (in the local histories generally, but erroneously, written *Lohīrī*), that Jānī Beg. Tarkhān, the ruler of Lower Sindh, intrenched his forces during the campaign of 1591-92, and for two months resisted all the assaults of Akbar's army, commanded by Mirzā 'Abdu'r-Raḥīm, his *Khān-i-Khānān*. Such was the strength of the position, and so clever the tactics of the Sindhi chief, who, possessing a numerous fleet and complete command of the river, was able to supply his own troops with ease, while, by raising the peasantry against the invaders, he succeeded in cutting off their convoys and menacing them with starvation, that the imperialist commander had at length to abandon the investment, and retire till his opponent could be lured out of the intrenchments.

of a vast area of blown sand, a circumstance which always indicates the former existence of a large bifurcation. Another tract of blown sand, but a much smaller one, is found at the head of the Rēn.

Passing still westward, we come to the present channel of the Indus. This divides the Lower Delta region<sup>6</sup> into two unequal portions. Of these, the western and much the smaller portion is in the form of an equilateral triangle, having sides of about 64 miles in length, consisting of the river, the coast-line, and the southern edge of the Kohistān plains, and including an area of about 1500 square miles. This it will be convenient to call the "Western Delta," a name the more suitable that all the westward flowing branches of the river have, or have once had, their mouths within the limits of the tract to which it will apply. Here there are only two branches which call for notice—the *Baghār* and the *Ghāro*. The former has its head in the Indus 6 miles south of Ṭhaṭa, whence it runs through the middle of the Western Delta, and communicates with the sea by several mouths, as the *Iishul*, *Shishā*, *Pītī-ānī*, *Kkūdī*, and *Pītī*. The name Baghār properly belongs to the channel only as far as the head of the *Shishā* mouth. Beyond this point the westward prolongation of the channel is known by various names in different portions of its course, such as *Khārā* (Brackish), *Rāho*, and others. The *Pītī* mouth, the farthest western embouchure of the Baghār, is 12 miles south-east of Karāchī. The Baghār is now merely a flood-channel, but it appears to have been for several centuries the chief western branch of the Indus, and it was a perennial stream so late as the early years of this century. The *Ghāro* runs nearly east and west along the southern border of the Kohistān, and is thus on the extreme edge of the Delta. Its course, which is about 40 miles in length, is, in fact, the last portion of what was once a large branch of the Indus. Another portion of this branch is found farther east in the *Kalrī*, now a flood-channel of the Indus, which it leaves a few miles north-east of Ṭhaṭa, and, flowing westward for some distance, eventually turns south, and joins the Baghār. The gap between the Kalrī and Ghāro is not more than 10 or 12 miles, and remnants of the old channel are found within it. The present southern course of the Kalrī appears to have been formed by the original stream having burst from its left (southern) bank at a point about 7 miles west of Ṭhaṭa, and forced a way for itself into

<sup>6</sup> That is, the tract south of about 24° 49' N. lat., where the Indus leaves the Kohistan.

the Baghār. West of this point the old channel then silted up for a few miles, and the lowest portion, kept open by the action of the tide, became a mere creek.

To complete this portion of our subject, there remains to consider the interesting question of the secular extension of the Delta seaward. The various surveys of the coast which have been made during the last half century, and especially those carried out since the British conquest of Sindh (1843), have shown that at the main embouchure of the river for the time being the advance of the banks seaward goes on at a surprisingly rapid rate. Thus, when the last survey took place (in the early part of 1877) it was found that during the ten years which had elapsed since the preceding survey the banks at the river mouth had advanced no less than  $3\frac{1}{2}$  G. miles, or at the rate of a third of a mile yearly. On the other hand, a marked diminution was discovered to have taken place in banks which, at the time of the previous survey, had lain immediately before a mouth of the river now no longer in action, the embouchure having moved farther westward; while at points beyond the immediate vicinity of the main river mouth the alteration of soundings was found to be very slight.<sup>7</sup> There is thus an immense gain of land on the sea at one particular point; but this point is ever shifting, and on the occurrence of each change the sea wins back a large proportion of its lost territory. What the rate of permanent gain to the land may be in this incessant conflict of opposing forces it is difficult to estimate. The advance of the Nile Delta has been estimated to be at the rate of 4 metres or  $4\frac{1}{2}$  yards annually;<sup>8</sup> and the solid matter discharged by the river has been put at 240 millions of cubic yards per annum,<sup>9</sup> while that of the Indus has been estimated to be  $217\frac{1}{2}$  millions of cubic yards.<sup>10</sup> According to the relative depositing capabilities of the two rivers, as deduced from these estimates, the mean annual growth of the Indus Delta might be taken to be nearly four yards; but it is evident that the result thus obtained needs large modification when the counteracting effects of the sea, so much more powerful in the Indian Ocean than in the tideless Mediterranean,

<sup>7</sup> Report on the Survey of the Mouth of the Indus in March 1877, by Lieutenant Stiffe, late Indian Navy.

<sup>8</sup> Credner, *Die Deltas*. Petermann's Mittheilungen, Ergänzungsheft, No. 56, s. 25.

<sup>9</sup> *Edinburgh Review*, January 1877, "Mediterranean Deltas."

<sup>10</sup> By Colonel Tremenhære, R.E., when chief engineer in Sindh. *Journal R. G. S.*, xxxvii. p. 70.

are allowed for, and no doubt the advance of the Delta of the Indus has been very much slower than that of the Nile Delta. It must be remembered, however, that the rate of progress of nearly all Deltas is not constant, but varies greatly at different periods;<sup>11</sup> and if the annual growth of the Nile Delta in the present age is estimated at something more than four yards, there appears to be ground for believing that in earlier ages it was at times greatly in excess of that amount. The writer in the *Edinburgh Review*, above referred to, adduces historical evidence to show that up to a certain point in its progress the Nile Delta advanced at the rate of 29 yards per annum. In the space of 2300 years its growth was 33 G. miles, or 38 statute miles. It is probable that the Indus Delta has grown under similar conditions, though always at a much slower rate. Unfortunately historical evidence in this case is of so precarious a character as to afford ground for little beyond conjectures more or less plausible. Such as it is, however, it may be worth while to examine it. It will accordingly come under review in the following section.

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## II.

### THE DELTA AT THE TIME OF ALEXANDER'S EXPEDITION (325-326 B.C.)

ARRIAN's narrative of the voyage of Nearchus furnishes the fullest information we have of the geography of the Lower Delta at that time, though unfortunately it leaves very much to be desired. It will be well, in the first place, to remind the reader of his description of the first few days' navigation. I translate from C. Müller's edition of the "Indike," in his "Geographi Græci Minores," vol. i.:—"Weighing from the naval station, they came to anchor the first day in a large channel<sup>12</sup> of the Indus, where they stayed two days. The place was named Stoura, and was about a hundred stadia from the naval station. On the third day they weighed, and sailed 30 stadia to another channel, where the water was now salt, for the sea

<sup>11</sup> See Credner, *ut sup.*, I. Theil. 7, "Maas des Wachstums der Deltas."

<sup>12</sup> The δαίρυρες which the Greeks met with in the Lower Delta were certainly not *canals*, as some have supposed, but natural channels which intersect the land near the coast in all directions. A canal, and one large enough to hold a fleet, would have been a phenomenon indeed.

ran up it, especially during the flood-tide, and the (salt) water remained mingled with that of the river, even at the ebb. The place was named Kaumana. Continuing from this their course down river for 20 stadia, they came to anchor at Koreatis, still in the river. Starting hence, they sailed but a short space, for a bar appeared at the spot where the Indus discharged itself into the sea; the waves too were breaking violently on the coast, and the coast itself was rugged. However, in a part of the bar which was soft they made a cutting for a space of 5 stadia, and through this, when the tide flowed again, they conducted the vessels. Then sailing a winding course (along the coast) for 150 stadia, they came to anchor at Krokala, a sandy island, where they remained the following day. Near this dwell the Indian tribe called Arabies, whom I have mentioned in my larger work, stating also that they have their name from the river Arabis which runs through their country and falls into the sea, separating their territory from that of the Oritæ. From Krokala they sailed, having on their right the hill called by them Eiros, and on the left a low flat island. This island, stretching along the face of the coast, rendered the (intervening) creek narrow. Clearing through this, they came to anchor in a commodious harbour, and as it struck Nearchus as spacious and fine, he named it 'Alexander's Haven.' At the harbour mouth, at a distance of about 2 stadia, there is an island named Bibakta, but the whole region is called Sangada. This island, placed as a barrier against the sea, caused the existence of the harbour."

There is reason to believe that the western branch of the Indus explored by Alexander, and from which Nearchus started on his voyage, was that of which the present Ghāro Creek formed the lowest portion. It is curious that though so much pains were bestowed on the exploration of the two main arms of this river, no mention should have been made of any minor branch. Yet it is impossible for any one acquainted with the hydrography of the Delta to doubt that there must have been many such in existence then, as at all times, or that, it being the period of high flood, some of them were navigable and of a size to render them deserving of notice. It seems most probable, however, from the large estimates of the distance between the mouths of the main arms of that day formed by some of those who took part in the expedition, that these arms were the extreme eastern and extreme western channels of the Delta. The

estimates were 115, 206, and 230 miles,<sup>13</sup> the *lowest* being almost exactly the direct distance between the mouths of these channels (the Kori and the Ghāro), as ascertained by recent survey. Further, some of the circumstances described in the passage above translated supply irresistible evidence, as I think, that it was through the Ghāro that Nearchus sailed into the sea. In that passage it is stated that there was a bar (*ἔρμα*) at the mouth of the river. This may mean either a reef or a bar of sand and mud, such as is found at all the river mouths, though the former is, I believe, the more usual meaning of the word. If we are to understand that the obstruction at the mouth of the river was caused in part by rock, it is certain that that mouth cannot have been situated to the east of the Ghāro, for along the whole sea-border of the Delta, to a depth of several miles, no rock, not even a stone, is to be found. This fact so impressed Sir A. Burnes, when in the Delta in 1831, that, on observing what he took to be a rock in the Pīṭi channel (immediately east of the Ghāro), he without hesitation identified it with the obstacle that had stopped Nearchus. He says: "Near the mouth of the river we passed a rock stretching across the stream, which is particularly mentioned by Nearchus, who calls it a 'dangerous rock,' and is the more remarkable, since there is not even a stone below Tatta in any other part of the Indus."<sup>14</sup> Had he really seen a rock, there would have been much to say in favour of his identification; but when, a few years after the British conquest of Sindh, a survey of the Indus mouths was carried out, special inquiries were made for Sir Alexander's rock, with the result of ascertaining that nothing of the kind existed. He had evidently mistaken an oyster-bank, such as is found occasionally in the tidal creeks, for rock, which these banks resemble.<sup>15</sup> The narrative further tells us that the coast outside the river mouth was *rugged* or *rocky* (*τραχέα*). Now, such an epithet would be utterly out of place if applied to the low mudbanks of the actual Delta coast, but would be quite appropriate as a description of that southern border of the Kohistān plain consisting of a compact gravelly soil, frequently broken by outcropping rock, and furrowed

<sup>13</sup> Estimate of Aristobulus, 1000 stadia; of Nearchus, 1800 stadia; of Onesicritus, 2000 stadia.

<sup>14</sup> Travels into Bokhara, iii. 16. Rock crops up in the Delta some miles below Tatta, but none exists, I think, within 35 miles of the coast.

<sup>15</sup> Mr. Fenner's Report on his survey of the tidal channels (in the Western Delta) of the Indus in 1848.

by the courses of hill-torrents, which, well elevated above sea-level, bounds the Delta between Karāchī and Thāṭa, and forms, it may be said, the northern bank of the Ghāro. At the present day the Delta extends along this ridge westward as far as Gisirī, near Karāchī; but it is probable, as will appear, that at the time of Nearchus's voyage the ridge for some miles east of Gisirī Creek was washed by the sea. Again, we are told that after leaving the river the fleet ran a *winding course* (εκπεριπλώσαντες), or, as Mr. McCrindle well interprets it, "followed the winding of the coast."<sup>16</sup> But had the fleet issued from any of the mouths east of the Ghāro, there would have been no windings to follow. The only coast then would have been that of the Delta, which is singularly straight and regular, the result of wave-action on its plastic material, and the course accordingly must have been shaped straight. On the other hand, leaving the Indus by the Ghāro mouth and keeping inshore, as it almost always did during the voyage, the fleet would be compelled to run a winding course in conformity with the irregular contour of the coast which it was following. The little descriptive details here mentioned forcibly suggest that the narrative reproduces on these occasions the actual words of the eye-witness from whom they were derived, and that in these passages Arrian copies verbatim Nearchus's account of incidents which must have been indelibly impressed on his memory. In the rugged shore lashed by the waves of the Indian Ocean, in the winding course run, we have no doubt a faithful picture, and it can hardly represent any other part of the Sindh coast than that which I have here described.

But before leaving for the moment the subject of the Delta, there is one point which deserves notice. It seems unaccountable that at the mouth of one of the principal arms of the Indus, and at a time of the year, probably September, when the periodical flood could not have wholly subsided, there should not be water enough on the bar, even at high tide (which at this part of the coast rises 7 feet at neaps and 9 feet at springs), to allow of the fleet's passing out till the channel had been artificially deepened. I am inclined to think that the explanation of this difficulty may be that on approaching the sea Nearchus led his fleet out of the main stream (possibly to avoid the current which at ebb-tide runs with tremendous violence at the larger Indus mouths) and through some one of the

<sup>16</sup> The Commerce and Navigation of the Erythrean Sea, p. 176.

side channels which the larger streams throw off in the vicinity of the sea. Such a side channel of the Ghāro actually exists, and is known as the Kudro. It runs, moreover, close under the rocky ridge which has been described, and its mouth may therefore have been obstructed, as we can readily understand, by some reef projecting into its bed. Near the present mouth of this creek there is a small port named Wāghūdar (Crocodile-hole), used by river-boats of light draught.

The question of the particular channel by which the fleet reached the sea being thus disposed of, the point next to be determined is the position of Krokala, as we have a measurement from the mouth of the river to that island which will help us to fix the line of the Delta coast at the time referred to. It will serve, however, to clear the way if we identify Alexander's Haven out of its order in the narrative. That Karāchī harbour, or rather Karāchī Bay, of which the modern harbour is an artificially limited portion, is Alexander's Haven, is generally admitted. Here, in fact, there is no choice of positions, for there is no other protected anchorage for seagoing vessels in all this region, far less any harbour which could be described as "kalos" and "euormos." Now it is quite clear from the narrative that Krokala was close to Alexander's Haven. Contrary to the regular habit of the narrator, no distance is given from Krokala, and we may infer that it was too short to be worth mentioning. Further, the fleet seems to have entered a creek immediately on quitting Krokala, and through this to have run into Alexander's Haven. It is thus evident that the two points were at no distance apart. But on leaving the island the fleet had a hill called Eiros on the right. The word "oros" is applied by Arrian to the cliff, or hill, or high ground, or whatever it was, that was named Eiros, and the word has always been rendered by his translators *mountain*; but as nothing that by any stretch of imagination can be called a mountain exists within 25 miles of even the present coast of the Delta, it is evident that whatever Eiros was, it was not a mountain. We must, therefore, assume the modified meaning of "hill," or "headland," or "high ground." Any of these would be applicable to Manora, which is the most prominent feature on this part of the coast, though its highest point is but 100 feet above the sea. General Cunningham accordingly finds Eiros in Manora, and says that to have Eiros on the right and a low flat island on the left would be a very accurate



description of the entrance to Karāchī harbour; but he forgot that it would only be accurate as a description of the bearings in the case of a vessel *leaving* the harbour, for a vessel entering has Manora on the *port* side. This disposes of Manora. There remain only two other hills or headlands in all this tract of coast. One of these, called "Clifton" by the English and "Hawa-Bandar" by the natives, is the eastern headland of Karāchī Bay; the other is Gīsrī, a mile east of Clifton. Clifton I believe to be Eiros. The "narrow creek" would then be Chinī Creek,<sup>17</sup> which runs under Clifton ridge into Karāchī Bay and harbour, and the "low island" Kīāmārī Flat, which *stretches along the mainland opposite Clifton ridge, and renders the intervening creek narrow*. Manora exactly answers to Bibakta in this respect, that, *being placed as a barrier against the sea, it gives rise to Karāchī harbour*; but I must admit my inability to make that other part of the description, "at the harbour mouth at a distance of 2 stadia," fit in with this identification. Manora is three-quarters of a mile or 6 stadia distant from Kīāmārī, at the nearest point. Moreover, it is not now an island, but is connected with the mainland to the west by a narrow ridge of sand some 10 miles in length. It should be mentioned that there are indications of some elevation of the land having occurred along this part of the coast. Mr. Blanford, when conducting the Geological Survey of the neighbourhood, found evidence near Cape Monze (Rās Mu'ārī) of "elevation of the land having taken place at no distant period."<sup>18</sup> Indications of a rise of the land were also observed by him along the coast to the west of Cape Monze,<sup>19</sup> and this may explain the total disappearance of the harbour called by Arrian Morontobaros, which appears to have been but a few miles east of the modern Sōn Mī'ānī, and is described as "large, well shut-in, deep, and still." Evidence to the same effect is found in the vicinity of Karāchī, where the sea now never reaches the high-water mark of former times. To this fact was no doubt owing the abandonment of a port the site of which was at the island, or rather mound, rising out of the surrounding mud, on which Karāchī Observatory stands. Here, according to native accounts, stood a substantially-built town, with a harbour, reached by a branch

<sup>17</sup> The mouth of Chinī Creek was closed some years ago in connection with the works carried out for the improvement of Karāchī harbour.

<sup>18</sup> Memoirs of the Geological Survey of India, vol. xvii. p. 184.

<sup>19</sup> *Ibid.*, p. 191.

of the Chini Creek, and resorted to by ships from various neighbouring countries. It is said to have been flourishing 400 years ago.<sup>20</sup> The sea has now receded so much from the site that it could not be reached by a rowboat.

But it is time to close this digression and return to Krokala. This, I believe, no longer exists, at least as an island. Whether through the elevation of the land or the silting up of the intervening channel, Krokala has, according to my theory, become part of the mainland, and is to be found in that sandy spit of land, or a portion of it, which projects south-eastward, in line with the present Delta coast, for some three miles from the bluffs of Clifton and Gisirī. Consistently with the evidence, it seems to me hardly possible to find Krokala in any other position than this. The narrative plainly conveys that the fleet, *on starting from the island*, had Eiros on the right.<sup>21</sup> Krokala and Eiros were, therefore, only a short distance apart, and I infer that there was but a narrow seaway north of the island to be traversed by the fleet before it ran under the headland of Clifton into Chini Creek. Dr. Vincent and General Cunningham have identified Krokala with Kāmārī,<sup>22</sup> which indeed is a "sandy island," but will be found by anybody who follows the narrative closely, and with the aid of a correct map of the coast about Karāchī, to have no other claim whatever to be regarded as the Krokala of Nearchus. On the other hand, it does correspond very exactly to the description of that other island which the fleet had on its left when passing through the "narrow creek" below Eiros into Alexander's Haven. The suggestion that, in the lapse of so many centuries, Krokala has become part of the mainland, seems to me to involve no improbability—nothing more out of the common than the shoaling and sanding-up of a perhaps narrow channel. Clifton sands have no doubt been formed to a great extent by deposit brought down by the Malīr river, a hill-torrent which drains a very wide area of the Kohistān, and, when in flood, pours a tremendous mass of water heavily laden with silt into the sea through the Gisirī Creek. If I am right in my view as to the position of Krokala, that island must have been a creation of the Malīr; for, being 150 stadia from the mouth of the Indus, it could not have owed its existence to the latter river. Whatever sea-space

<sup>20</sup> MSS. notes by a native merchant of Karāchī.

<sup>21</sup> Ἐκ δὲ Κρωκάλων ἐν δεξιῇ μὲν ἔχοντες τὸ καλεόμενον αὐτοῖσιν Εἶρον . . . ἔπλων.

<sup>22</sup> See Vincent's "Commerce and Navigation of the Ancients," i. 194 *et seq.*; and Cunningham's "Ancient Geography of India," pp. 306, 307.

there was between the island and the mainland may have been filled up gradually by Malir silt and sea-sand, and the elevation of the coast would of course contribute to the same end.<sup>23</sup>

The position of Krokala being thus determined, in the only way, as it seems to me, to accord with the evidence, the coast-line of the Delta, as it was in those days, must be fixed by the measurement given between the two points, namely, 150 stadia. But here we meet with another difficulty in the extremely erroneous estimates of his runs which Nearchus made throughout the voyage. From Alexander's Haven to the frontier of Carmania these estimates are greatly in excess of the truth, and beyond that point they are far below it, as has been proved by the checks supplied by modern charts. So great is the excess of error during the first part of the voyage, that writers like D'Anville and Vincent have come to the conclusion that the estimates were based on some standard which they have taken to be about half the dimension of the Olympic stadium. It is obvious, however, that this hypothesis would meet the case of only one set of distances, and that consistency would require the assumption of an enlarged stadium to explain the error of defect in the other set. But, as pointed out by Mr. Bunbury, in his "History of Ancient Geography," there is no evidence whatever that any other than the ordinary stadium was in use among the Greeks, or known to them; and were it otherwise, the employment by a writer of different standards in different parts of the same work would be highly improbable.<sup>24</sup> The same high authority shows that there is some ground for suspecting Nearchus to have based one of the most important of all these estimates on the rough method of calculating a full day's run at 500 stadia, or 50 G. miles.<sup>25</sup> Such was, indeed, the common method in ancient times, though the standard distance of a day's voyage varied, and it may safely be assumed that Nearchus knew no other way of calculating his runs. We may take it, then,

<sup>23</sup> The name Krokala is, as might be expected, wholly unknown in the locality. The suggestion that it was a Greek corruption of Kakrāla (the name of an ancient division of the Delta), started by Pottinger and repeated by Burnes, is not without plausibility; but Kakrāla was a tract near the middle of the Delta, in the present Pargana of Ghorābārī, and fully 50 miles to the south-east of Karāchī. There is, I believe, no foundation for the statement that the country around Karāchī was ever called Kakrāla. At the time of Nearchus's voyage it bore the name of Sangada, as we are expressly informed.

<sup>24</sup> History of Ancient Geography, i. 544-545.

<sup>25</sup> Ibid., 531, note 8. See also p. 393.

that 150 stadia represent a run of somewhere about  $3\frac{1}{2}$  hours; and remembering that the fleet was contending against a rough sea and an adverse wind,<sup>26</sup> and that this was the first day's experience of the ocean, it can hardly be supposed that vessels impelled by oars would make a better rate of progress than  $2\frac{1}{2}$  miles an hour. The entire run, then, would be 9 miles, and this distance measured eastward from Clifton Spit round the "windings of the coast" will bring us to a point close to the hamlet of Wāghūdar, which point is 8 miles in direct line from the coast of the Delta as laid down in 1869. Thus it may be conjectured that in the space of 2195 years (326 B.C. to 1869 A.D.) the advance of the Delta seaward has been 8 miles, or at the rate of rather more than 6 yards in a year. This is less than a fourth of the growth of the Nile Delta in a not much greater period of time.

From this conjectural determination of the coast-line of these days we may proceed to fix, alike conjecturally, the position of the "naval station" which was the point of departure of the expedition. This was a little more than 150 stadia from the mouth of the river, or almost exactly the same distance as from the mouth to Krokala. Here, however, the different nature of the navigation, that is to say, comparatively smooth water and a current powerfully aiding the efforts of the rowers, will call for a much smaller reduction of the estimated progress than in the case of the navigation in the open sea. It is possible, indeed, that the rate of progress in the river may have

<sup>26</sup> The south-west monsoon was still blowing, as is proved by the fact that the fleet was detained in Alexander's Haven for twenty-four days by continuous gales from the sea. Unless meteorological conditions have totally changed in these regions, here is proof positive that the date of Nearchus's departure from the Indus was earlier than most commentators suppose. This is variously computed as 2d October 326 B.C. and 21st September 325 B.C., and we have then to account for the occurrence of twenty-four days of "*high and continuous gales*," beginning either in the last days of September or at the end of the first week of October; that is to say, lasting during the period which is *invariably* the calmest in the whole year, as all who know Sindh can testify. The violence of the south-west monsoon is past by the middle of August, and a month later the wind drops almost entirely, though what is called the "Elephanta" storm occurs in September, lasting, however, but a few hours. I have no hesitation in saying that the occurrence of twenty-four days of continuous gales at the time of the year during which Nearchus is generally supposed to have been in Karāchī harbour is opposed to all modern experience of the meteorology of the Indian Ocean and its coasts. Dr. Vincent took these gales to have been the north-east monsoon, but that does not set in till November, and is never, I believe, experienced on the Sindh coast in so violent a form as continued gales for more than three weeks.

been *under*-estimated in consequence of these circumstances, though it may be well still to assume some exaggeration. I would then reduce the  $17\frac{1}{4}$  miles—the true equivalent of 150 stadia—plus the small excess which has not been specified, to 15 miles, and thus fix the naval station at a point about a mile west of the mouth of the “Ghaghar” hill-torrent. Under the circumstances, suppressed by Arrian but revealed by Strabo, of the energetic hostility of the natives, which led to the hurried departure of Nearchus from Sindh, it is probable that the naval station, whither the Greeks must have withdrawn on finding their position at Patala no longer tenable, was not on the right bank of the river, that is, on the Kohistān plain, where it would have been exposed to attack, but in some one of the islands of the Lower Delta, formed by branch channels, where it would be comparatively secure. The other anchorages, which were but very short distances apart, must have been a few miles to the east of Wāghnūdar. It is needless to say that no names at all resembling Stoura, Kaumana, or Koreatis—themselves most probably gross corruptions—are now to be found in the locality.

From the vicinity of Krokala we have a measurement which will be of some service in fixing the position of Patala; for we learn from Arrian that near Krokala lay the eastern limit of the territory of the Arabies, and from Quintus Curtius that Alexander’s army took nine days to march from Patala to this point. It is probable that the Malir river—the most important natural feature in this region—would form a boundary between tribe and tribe, just as the Pūrālī (Arabīs) bounded the Arabies on the west, and separated them from the Oritæ. The Malir runs into the sea through the Gisrī Creek, and therefore close to the position which has been assigned to Krokala; so that it would be quite consistent with Arrian’s statements and with all the probabilities of the case to take this stream as the tribal boundary, and some spot near its mouth as the point reached by Alexander in his ninth march from Patala. Now, Quintus Curtius says that from this point to the Arabīs (Pūrālī) there were five marches,<sup>27</sup> and the actual distance is about 57 miles; so that here his day’s march averaged about  $11\frac{1}{2}$  miles. But as the ground traversed is not throughout so level and easy for the soldier as the plains of Sindh, we may reasonably suppose a somewhat higher rate for the earlier marches, say 13 miles. This

<sup>27</sup> Quint. Curt., Lib. x., § 39.

will give us a measurement of 117 miles from the point named Patala, and we have next to consider in what direction the measurement should be made. It may be assumed that Alexander would select that route for his large army which afforded the best supply of water; that he would, if possible, keep within easy reach of the river or one of its branches; and that, unless under some strong compulsion of circumstances, he would not march an unwieldy host across the comparatively waterless plain of the Kohistān. Patala was on the Indus, and close to a large bifurcation whence a large branch ran westward—the direction which the army was now to take. It seems obvious that the earlier part of the route would follow this branch. Now if, as we have some good ground to conjecture, the Kalrī and Ghāro formed the lower portion of this branch, it follows that the upper and now obliterated portion, lying between Patala and the present head of the Kalrī north-east of Ṭhaṭa, must have come from some point far out in the middle portion of the Upper Delta country. In other words, the bend of the river westward from Patala must have been gradual, as bends always are in streams which work their way through yielding alluvial soil. To suppose, with General Cunningham,<sup>28</sup> that Patala was at or near Ḥaydarābād, and yet that the western arm of the Indus is to be identified with the Ghāro, involves the position that the stream turned almost at right angles into the present Kalrī. But nothing short of meeting with rock, which does not exist here, could possibly cause such an abrupt deflection from the general direction of the river. A study of the hydrography of the Delta shows that as the Indus north of Ṭhaṭa has forced its bed westward, so below that town there has been from time to time a movement of the channel in the opposite direction. The stream, that is to say, has a tendency to straighten its course, and the constant pressure westward is compensated in the Lower Delta by sudden shiftings, at longer or shorter intervals, into channels farther east. Thus the identification of the Ghāro and Kalrī with the western branch of Alexander's time carries with it as a necessary consequence the conclusion that Patala was situated considerably east of the longitude of Ḥaydarābād; and if we measure 117 miles from the eastern border of the Arabies, that is, as I suggest, from the Malīr near Karāchī, along the Ghāro and Kalrī, and the *probable* upper

<sup>28</sup> Ancient Geography of India, p. 279 ff.

portion of the western branch, we shall find that the ancient capital of the Delta was most likely not far from a spot 35 miles south-east of Haydarābād. Those who have identified Patala with Haydarābād have overlooked the fact that the Indus reached the vicinity of that place so recently as the second half of last century, and that even a thousand years after Alexander's expedition, when the Arabs appeared on the scene, the river was still far to the east of the position they assign to the chief town of the Delta. Nothing, indeed, can be more misleading in connection with such a river as the Indus than to base arguments for particular identifications on the hydrographical circumstances of the present day; for it may be regarded as almost absolutely certain that hardly any channel now carrying water was in existence in the distant times referred to; and instead of seeking for very ancient sites along the present course of the river, we should rather assume that, wherever they may be, here, at all events, they are not to be found. As regards the Thaṭa identification, it can easily be shown to satisfy no one of the conditions of the problem. One consideration alone is fatal to it. The effect of the tide must have been distinctly perceptible higher up the Delta than Thaṭa twenty-two centuries ago, since it is perceptible as high up as that place now, or was so not many years ago, the rapid extension of the land at the mouth of the river, and consequent lengthening of the channel, having perhaps rendered the tidal rise less noticeable at this spot within the last few years. But it is quite clear that the effect of the tide was not apparent at Patala or anywhere in its vicinity, for it was not until Alexander and his exploring party had left that place far behind them that they became aware that such a phenomenon as the tidal flow existed. On this ground alone then it is certain that Patala cannot have been anywhere near Thaṭa.

The spot upon which I have fixed as the probable position of Patala happens to be equidistant from both extremities of the Delta coast as supposed to have existed in Alexander's time, the direct measurement from point to point being about 106 miles in each case. This is also very nearly the length of the Delta base, and thus if we might combine the statement of Onesikritus that the Delta formed an equilateral triangle with the statement of Aristobulus that the base measured 1000 stadia (115 st. miles), we might be pretty certain of having determined the site of the capital with considerable accuracy. Unfortunately neither is Onesikritus regarded as a trustworthy autho-

rity, nor had he, or any one else in the expedition, the means or opportunity of forming anything but the roughest possible guess as to the shape and extent of the Delta. All, therefore, that we may legitimately infer from their statements is that there was no considerable difference between the lengths of the two branch streams, and that the mouths of these were very far apart, each almost certainly at an extremity of the Delta base.

Various suggestions have been made in regard to the true name of the town which the Greeks called Patala. It seems to me, however, that the question has been solved by the tradition discovered in Tibet by the gifted and laborious Csoma de Körös, who has thus recorded it: "Potala or Potalaka (Tib. Gru-hdsin, or vulgo Kru-dsin, Boat-receiver, a haven or port) is the name of an ancient city at the mouth of the Indus river, the residence of Ixwāku and his descendants of the Suryavamsa. Four young princes (who afterwards were surnamed Shākya), being banished from that city by their father, took refuge in Kosala on the banks of the Bhāgirathī river (in the modern province of Rohilkhand), and built the city of Capilavastu. The residence of the Dalai Lāma at Lassa (built about the middle of the twelfth century) is likewise called Potala, because Chenrezik, the patron of the Tibetans, the spiritual son of Amitābha, is said to have resided at Potala in ancient India, and to have visited Tibet from that place."<sup>29</sup> Whatever amount of credit may be allowed to this tradition, it cannot be doubted that it has at all events preserved for us the correct name of the ancient capital of the Delta—a name too simple in form for even Greeks to corrupt materially. Further, it seems to show that Potala was a foundation of very distant times indeed, and we may perhaps infer that it was one of the earliest Aryan settlements in the neighbourhood of the ocean.<sup>30</sup>

The eastern arm of the Indus, explored by Alexander immediately after returning to Patala from his first voyage to the Indian Ocean,

<sup>29</sup> *Journal Bengal Asiatic Society*, vol. vi. p. 349, where the above extract is quoted from Csoma de Körös' MSS. See also Csoma de Körös' own article in the same Society's Journal for August 1833, vol. ii. p. 385.

<sup>30</sup> In Map II. Patala is represented as situated between the two arms of the Indus, in conformity with the statement of Ptolemy that the place was in one of the islands formed by the river (Geog. Lib. vii. C. I., § 59). The courses of the Indus and its branches, as shown in this map, except the portion west of Thāta, and the few miles of the Purān immediately north of the Ran of Kachchha, are, I need hardly say, purely conjectural.



was probably some channel running into the Purān, not many miles, perhaps, above the point where it enters the Ran, as represented in Map ii., the Purān being, as previously stated, the extreme eastern channel of the Indus, and, as its name indicates, of great antiquity. That the Ran itself was the *large lake* into which the eastern arm flowed admits of no doubt, and it is a highly interesting question whether it had at this time ceased to be a permanent inland sea or not. The voyagers themselves supposed it to be a lake formed by the discharge of the eastern branch of the Indus, and perhaps of other streams running into it; but they saw it during the very height of the south-west monsoon, at which season the Ran is under water even at the present day when the Indus has long ceased to send any portion of its waters into it, unless at times of exceptionally high flood. The Ran is in reality flooded during the period of the south-west monsoon only, and then by the sea being forced into it through the Gulf of Kachchha and the Korī Creek—mainly through the latter. But the water is everywhere shallow, and certainly *fish larger than those of the Mediterranean* could not now be found in it. It is possible, however, that the large fish seen by the Greeks may have been in the deeper Korī Creek, the upper part of which may have been regarded as a portion of the lake.

According to Lassen, the drying-up of the inland sea which once covered the Ran is referred to in the Mahā Bhārata, and described as a miraculous occurrence, and an act of vengeance for a misdeed of the god Varuna.<sup>31</sup> If Lassen is right in asserting that the myth refers to the Ran, and if the myth itself belongs to the Mahā Bhārata in its original form, and is not an addition of later times—points on which I am incompetent to form any opinion—there can be no doubt that the origin of the Ran is far older than the time of Alexander.<sup>32</sup> The local traditions, however, seem to show that the inland sea had existed to a much later period, and various places on the shores of the Ran are still spoken of by the natives as having formerly been *ports*.<sup>33</sup>

<sup>31</sup> "Indische Alterthumskunde," I. 546, n. 1., Edn. 1847, where the myth is given.

<sup>32</sup> The learned assign the date of the composition of the Mahā Bhārata to a period considerably later than that of Alexander (Weber's "History of Indian Literature," p. 186, and note 201a p. 187), but of course the myths and legends embodied in it are of much greater antiquity than the epic itself.

<sup>33</sup> See Sir A. Burnes' account of the Ran in the third volume of his travels into Bukhārā, and an article on the same subject by the late Sir Bartle Frere in the *Journal of the Royal Geographical Society*, vol. xl. pp. 194, 195.

In the first century of our era the water in the Ran was shallow, according to the author of the "Periplus," who seems to have been accurately informed, since he correctly describes the Ran as divided into "Greater" and "Less."<sup>34</sup> The eastern or smaller Ran would appear to have been under water, and subject to the regular influx of the tide, in 1026, when Maḥmūd of Ghaznī, after capturing Somnāth, pursued a Hindu chief who had taken refuge in one of the islands of North-Eastern Kachchh. Maḥmūd was warned that in attempting to reach this island he might be overwhelmed by the tide, but he rode into the water, followed by his troops, and crossed in safety.<sup>35</sup> By the latter part of the fourteenth century the Ran was dry, for the Emperor Fīrūz Shah and his army, retreating from Sindh to Guzarāt, wandered for some days in it, and nearly perished from heat and thirst. In Kachchh an old legend attributes the drying-up of the inland sea to the curse of a holy man—a frequent and potent cause of physical changes in the East—and this and the older myth of the Mahā Bhārata (of which, however, it may be only a local modification) would seem to point to *suddenness* in the event, and no doubt as Sir A. Burnes thought, earthquakes had much to do with it. This region has suffered greatly from such catastrophes, and the earthquake of 1819 caused, as is well known, a very remarkable and extensive alteration in the surface of the Ran.

One more point may be noticed in concluding this section. It is stated by Arrian (Anab. vi. 20), that on reaching the sea by the eastern branch of the Indus, Alexander landed, and taking some cavalry with him, proceeded three marches along the coast (*παρὰ θύλασσαν*), and ordered wells to be dug for the watering of his fleet, it being his intention to despatch the naval expedition by the eastern and more easily navigable arm of the river. Any one who knows the nature of the Delta coast will have no hesitation in pronouncing this statement to be a fabrication. Such a march would be an utter impossibility, and the notion of wells being dug in the locality must be scouted as an absurdity. The Delta coast is so low as to be liable to inundation by high tides in ordinary weather. It is also intersected

<sup>34</sup> "Periplus of the Erythraean Sea," § 40.

<sup>35</sup> Sir H. Elliot's "History of India," vol. ii. p. 249, and appendix p. 473. The fort in which the Hindu chief took refuge is called Kandabal, Kandama, and other names. It has since been identified—I think by Colonel Watson, an excellent authority—with a place in one of the islands in the Ran.

by numberless creeks and channels, large and small, so that neither man nor horse could traverse it for any distance, and the only means of getting from point to point is by boat. But during the monsoon—the period of this alleged march—the whole sea-board is under water, and there is no part of it in which a person could travel without risk of being overwhelmed by the sea at any moment. The south-eastern corner of the Delta, too, is the most inhospitable of the whole coast. It is, in fact, a vast salt-field where life could not be maintained, and where none but poisonous water could be procured from wells if it were possible to sink them in an inundated country.<sup>36</sup> The episode, then, of the three days' march along the shore, and the account of the arrangement for watering the fleet must be rejected as pure fiction on the part either of Arrian or of his authority.

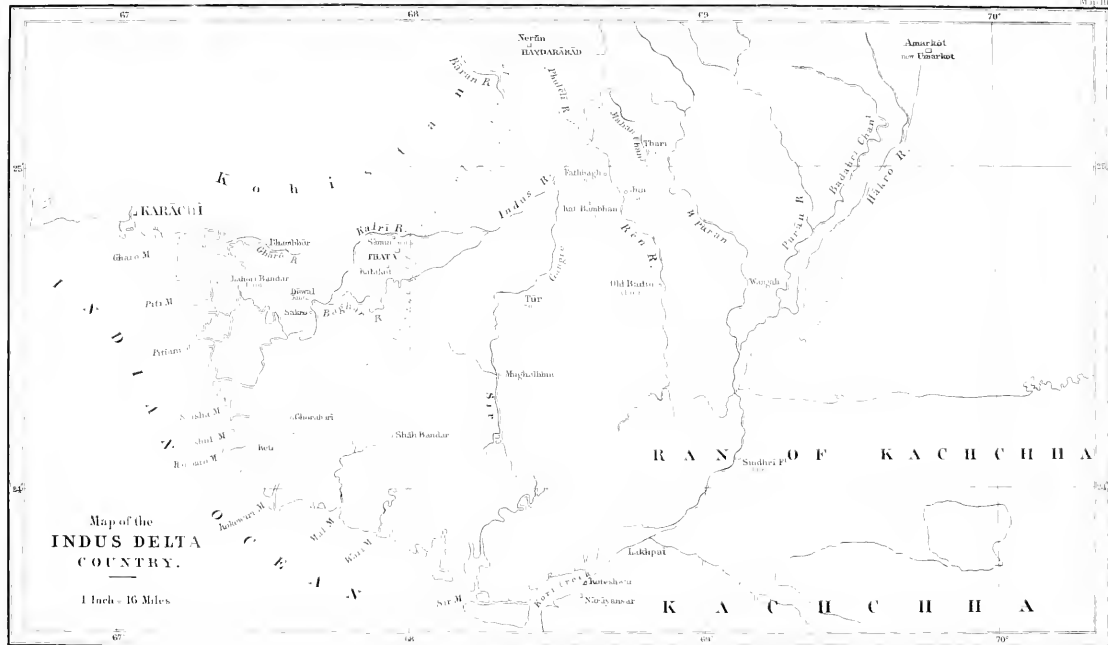
<sup>36</sup> Some years ago an attempt was made to work the salt-field at a spot several miles from the sea. Every drop of water required by the workmen had to be brought *by boat* from a great distance.



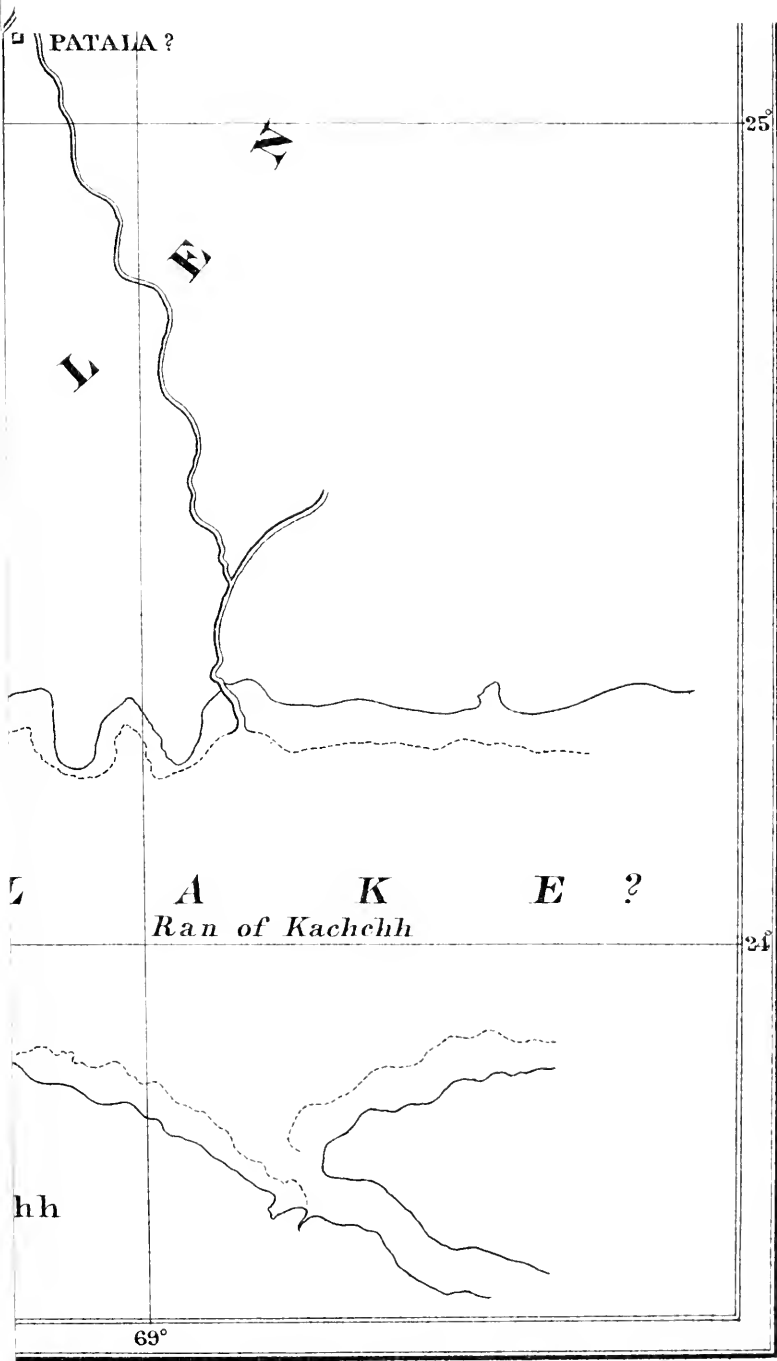
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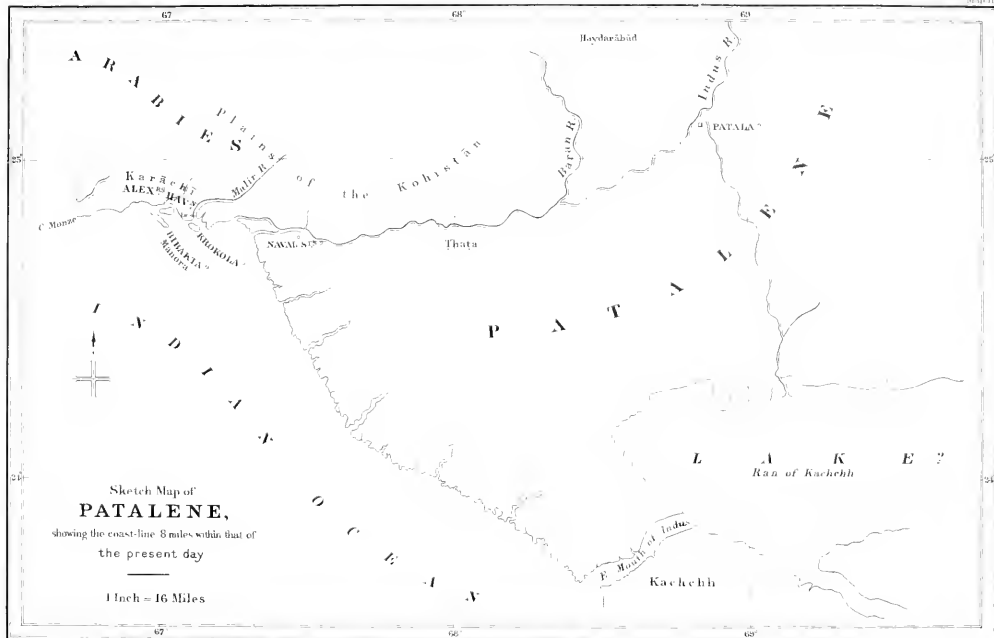




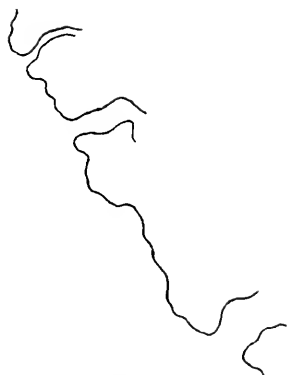








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Edw. Weller. 1888





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